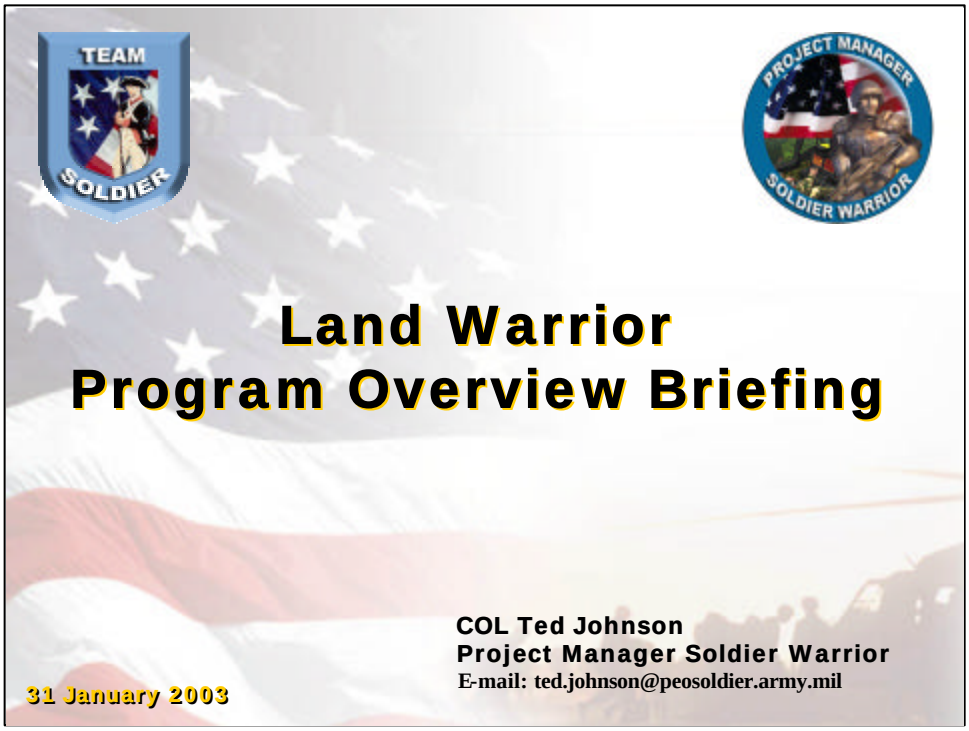
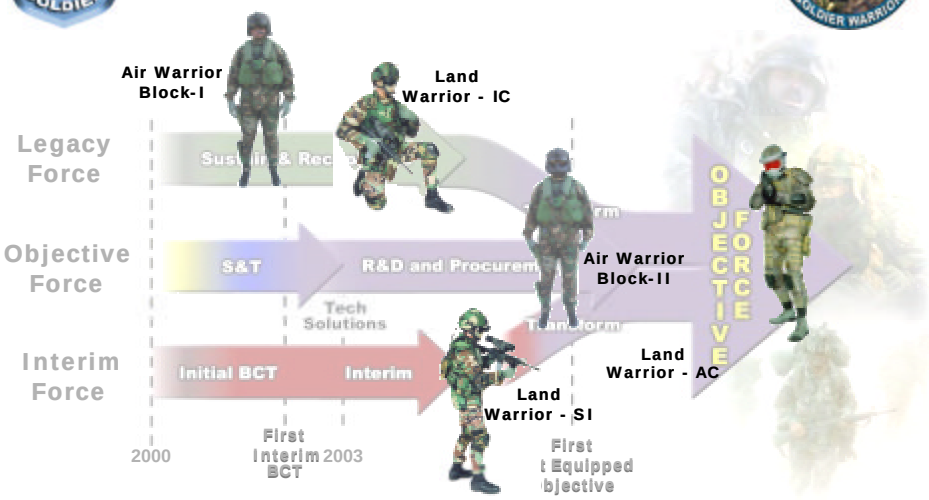

TEAM
SOLDIER
PROJECT MANAGER
SOLDIER WARRIOR
Land Warrior
Program Overview Briefing
COL Ted Johnson
Project Manager Soldier Warrior
E-mail: ted.johnson@peosoldier.army.mil
31 January 2003

Purpose

vide Overview of the
nd Warrior Program
nd Warrior Cost Model

PM Soldier Warrior Roadmap



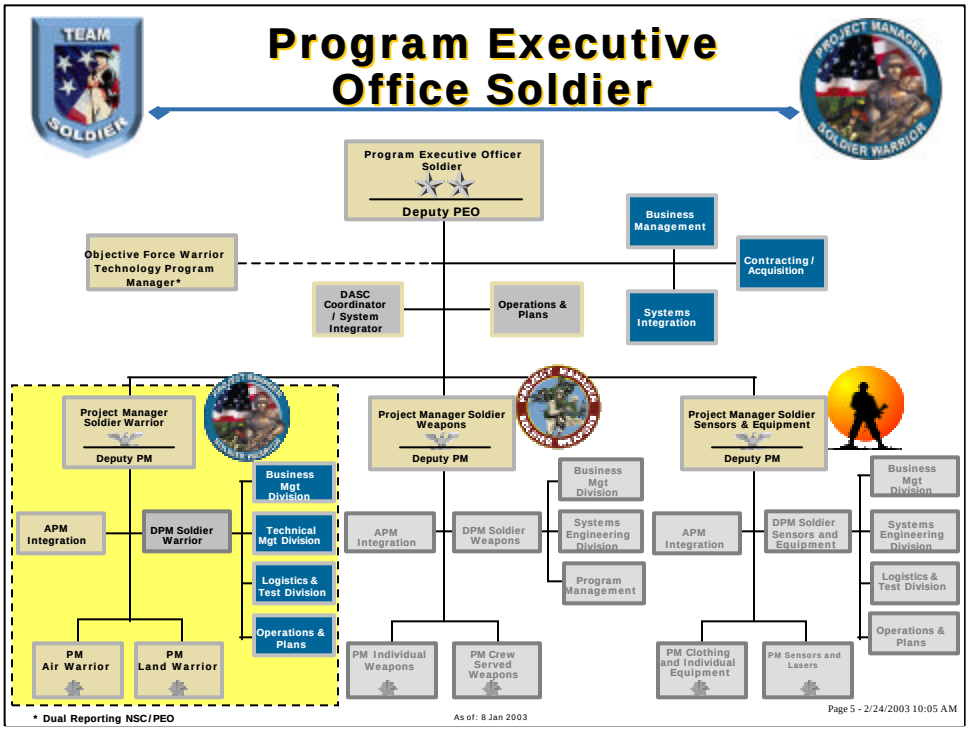
Soldier Warrior Systems are Centric to Army Transformation

Soldier As A System

- Wears
- Carries
- Consumes

Arm and Equip Soldiers to Dominate the Full Spectrum of Peace and War Now and in the Future.

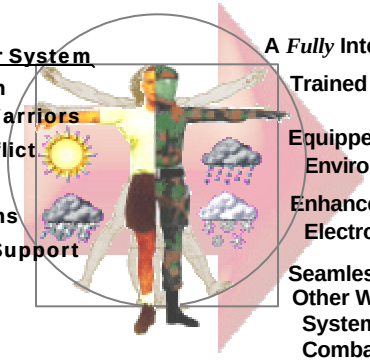
Integrating 346 programs for the Soldier


Program Executive Office Soldier
Program Executive Officer Soldier
Deputy PEO
Business Management
Contracting / Acquisition
Objective Force Warrior Technology Program Manager*
DASC Coordinator / System Integrator
Operations & Plans
Systems Integration
Project Manager Soldier Warrior
Deputy PM
Business Mgt Division
APM Integration
DPM Soldier Warrior
Technical Mgt Division
Logistics & Test Division
Operations & Plans
PM Air Warrior
PM Land Warrior
Project Manager Soldier Weapons
Deputy PM
Business Mgt Division
APM Integration
DPM Soldier Weapons
Systems Engineering Division
Program Management
PM Individual Weapons
PM Crew Served Weapons
Project Manager Soldier Sensors & Equipment
Deputy PM
Business Mgt Division
APM Integration
DPM Soldier Sensors and Equipment
Systems Engineering Division
Logistics & Test Division
Operations & Plans
PM Clothing and Individual Equipment
PM Sensors and Lasers
* Dual Reporting NSC/PEO
As of: 8 Jan 2003
Page 5 - 2/24/2003 10:05 AM

The Warrior System

Vision

A Fully **Integrated Warrior System**
Enhancing **Combat Overmatch**
Tailorable for All Warriors
In **Full Spectrum Conflict**
During **Joint**
and **Coalition Operations**
Within **A System Centric Support Architecture**

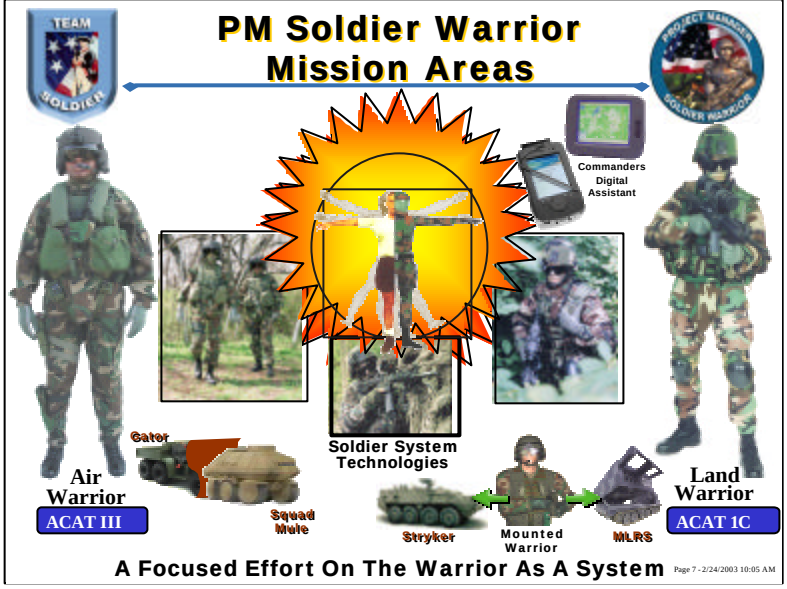


Definition

A *Fully* Integrated Warrior System:

- Trained and Ready Warrior
- Equipped For Operational Environments
- Enhance Lethality Through Electronic Battlefield
- Seamlessly Integrated With Other Warriors their Weapon Systems and the Future Combat System

A Focused Effort On The Warrior As A System



We are both Soldier centric and Chem-Bio centric in our focus. Most have DoD-wide missions

Airdrop - we develop all the cargo and personnel parachutes for all of the services.

The field feeding - that is, the rations and the field fielding systems are all developed by the Army for all the services.

Field Services - the baths, the showers, the laundries, we develop those for all the services.

We develop all the combat clothing for all the services with the exception of some that are unique to the navy sea mission.

Integrator for the Soldier System - this one is not yet a joint program but we do work closely with the Marine Corps on those requirements.

Shelters - we develop most of the shelters for the other services and are the lead integrator for the Joint Committee on Tactical Shelters that oversees the DOD wide responsibilities for shelter requirements. We are also responsible for Chem-Bio protective shelters so this is an area were the two foci converge.

Chemical & Biological Protective Clothing and Masks are developed here and at Edgewood for all services and again shows the overlap of our two mission focus.

Obscurants – we provide Joint forces with state-of-the-art battlefield obscuration capabilities. Large area obscuration provides both visual and infrared obscuration capabilities to our light and heavy maneuver forces.

Decontamination systems -we provide the soldier with the capability to perform immediate, detailed, and sensitive equipment decontamination on the battlefield.

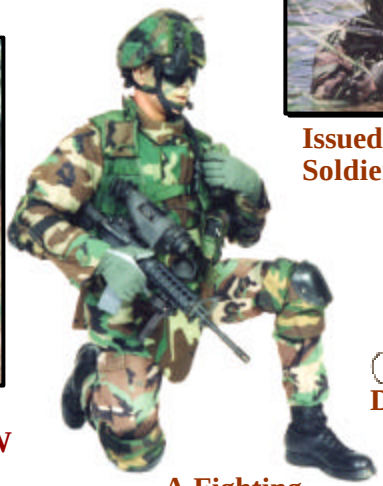
NBC Reconnaissance , Detection, Warning and Reporting Systems are all Joint Programs supporting all services.

We focus our development to items for Sustainment, Survivability, Mobility and Well Being. - -

The Land Warrior System

(A Fully Integrated Soldier System)

Land Warrior includes everything a soldier wears or carries integrated into a system of systems…



LW-Combat ID System combines ICIDS (terminated program) technology with LW Soldier-to-Soldier communications and common operational picture to reduce fratricide risks.

A Fighting System…

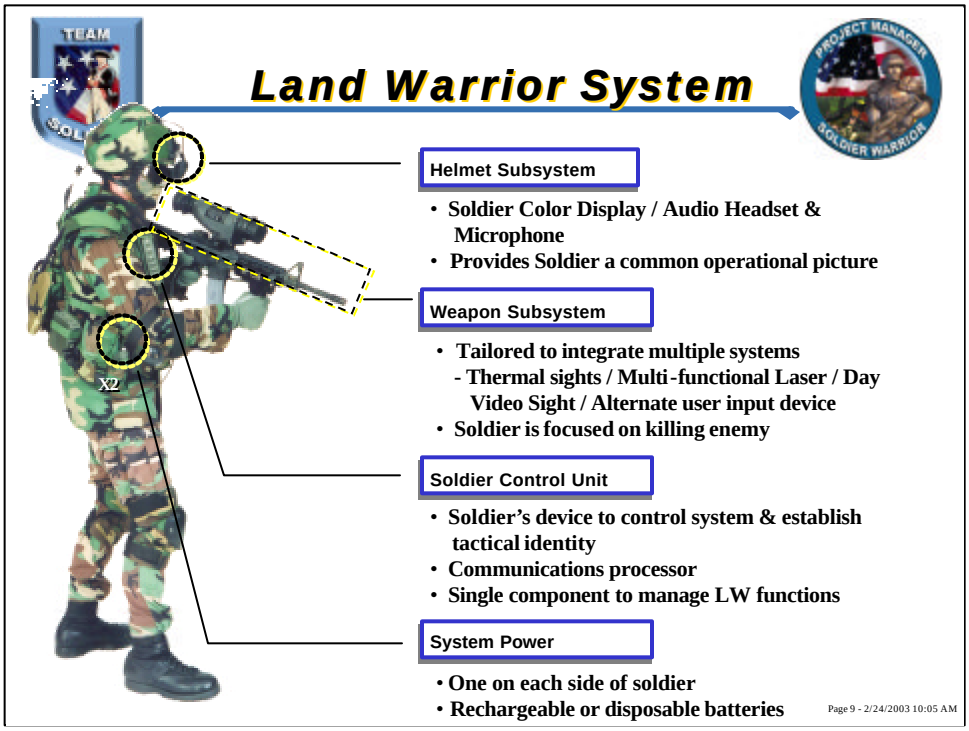
Issued to Combat Soldiers…

Commanders Digital Assistant (CDA)

Designed For the Close Fight…

Squad Mule

ACAT 1C Program



The Land Warrior system is characterized by multiple subsystems that are integrated to achieve a more effective infantry small unit. The system in total enhances the effectiveness of the overall fighting team.

The helmet subsystem consists of the helmet mounted display, hearing and microphone devices. The HUD provides the soldier the ability to interface with all LW functions. During tactical movement and contact, it will be primarily used to verify his own location, his local friendlies location and his orientation of fire.

The Soldier Control Unit is the primary soldier input / interface device with the system. With this unit, the soldier can manipulate his system configuration as well as generate and send tactical messages. The SCU also maintains internal processing power that allows soldier weapon and messaging functions to remain operational even if the main computer fails.

The Weapons subsystem is based on the M4 Modular Weapon System. Based on duty position, the soldier may mount currently issued aiming lights, IR pointer, or a multi-functional laser. The MFL combines multiple functions of currently fielded systems into one device as well as integrating a laser range finder and direction of fire capability. All information is routed into the Land Warrior System and automatically fills message fields as applicable. There is also a peg grip on the stock of the weapon that allows for transition between sighting systems as well as execute message management without removing a hand from the weapon.

The system is powered by two disposable batteries that weigh two pounds apiece and each can accommodate a system runtime of 12 hours apiece. The system will also use rechargeable batteries lasting from 6-9 hours apiece. The system in total enhances the effectiveness of the overall fighting team.

The communications subsystem seen here is the Land Warrior Wide Area Local Area Network. We refer to it as the soldier intercom. With an antenna embedded on the top of the helmet, soldiers will be able to communicate within their small unit. Range is also enhanced by a mesh concept that allows each soldier to act as a repeater for a message to a recipient not in direct line of sight range. The WLAN is operating in a sensitive but unclassified mode. Squad leaders and above are also issued a Multi-band Inter-Team Radio (MBITR) that the program leveraged from current USASOC fielding. This radio provides longer range leader communication. It is type I encrypted. The equipped soldier can communicate via voice with current SECRET HIGH combat net radios such as SINCGARS.

The computer subsystem is the core of the LW system. It stores NIMA approved map products, field manuals, as well as system information.

The navigation system allows the soldier to integrate a GPS receiver on the left shoulder, calculates a heading reference and overlays this graphically on a map product. This system also incorporates a dead reckoning module should the GPS fail or fail to acquire sufficient satellites. The DRM will be useful for a limited period of time in these conditions until the soldier can reacquire his position.

The final component of the LW system is all the other items that comprise the soldiers combat load. The requirements intent is to begin with a soldier as a system requirement to catalyze soldier a system materiel solutions.


Land Warrior
System Roadmap
FY00
Land Warrior V0.6
FY04
Land Warrior
Initial Capability
(Land Warrior-IC)
Meets KPP Requirements
Mounted Warrior
FY05
Land Warrior
Stryker Interoperable
Capability Improvement
(Land Warrior-SI)
Commanders Digital Assistant
• Stryker Integration
• Tactical Internet Connectivity
• Vehicle -based Battery Recharging
FY08
• FCS Compatibility
• Mission Increase (24 hours)
• Weight Decrease (10%)
FY11
Land Warrior
Advanced Capability Improvement
(Land Warrior-AC)
Objective Force Compatibility
Land Warrior
Air Warrior
CORE COMMON
Mounted Warrior
Objective Force
Medic Warrior
SOF Warrior
Objective Force Soldier
Science & Technology
Acquisition Program Metrics
Evolutionary Acquisition Approach with Revolutionary Technology

Senior Army Leadership Guidance for Land Warrior

Pending OSD ACAT ID designation

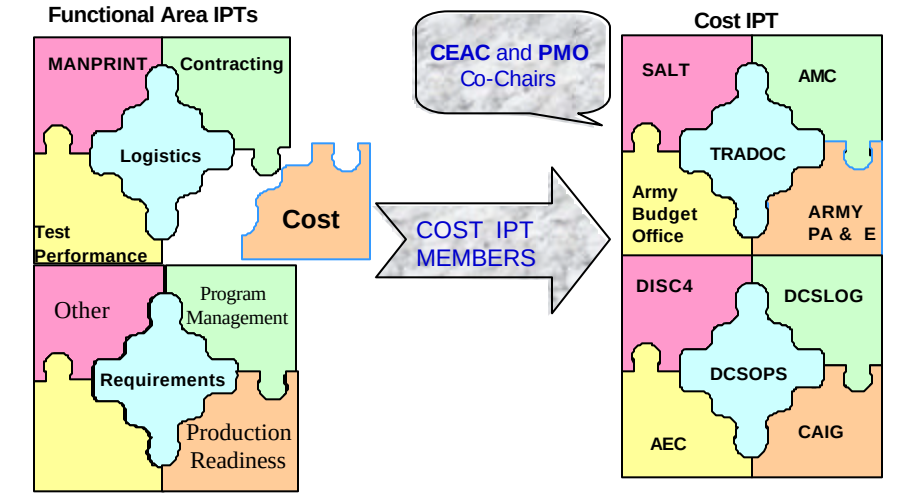
Soldier System Modernization is a Critical Component to the Army's Transformation

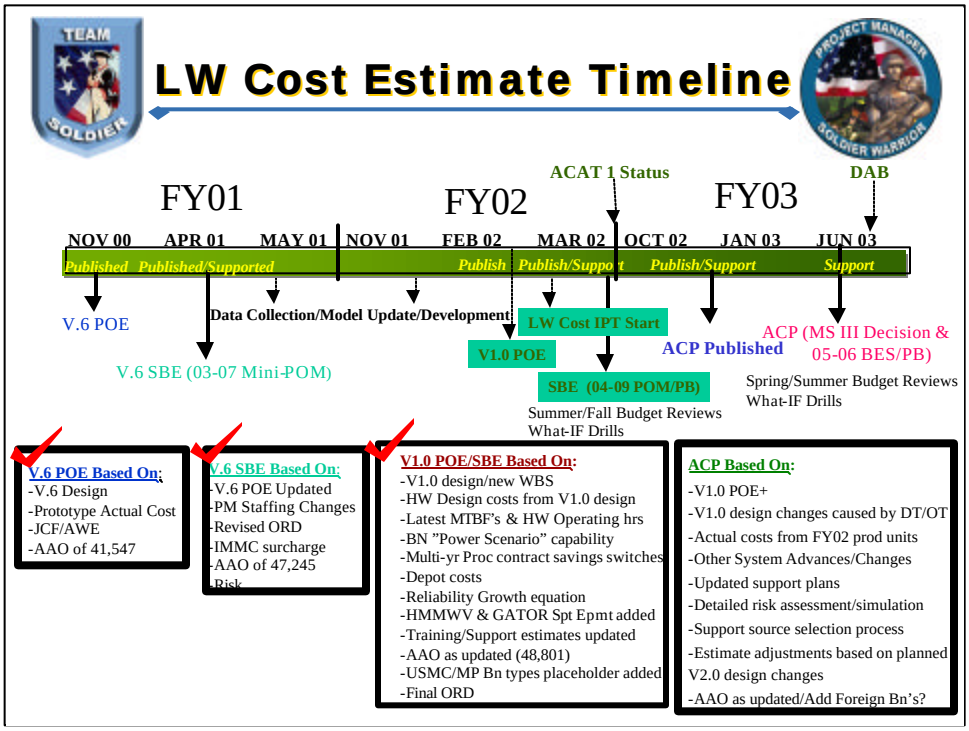
ORD Currently in DA Staffing

- **VCSA AUG 99**
  - ✓ Redirection of LW Program
  - ✓ Successful JCF AWE in Sep 00
- **TRADOC FEB 01**
  - ✓ Link LW to Objective Force Concept
  - ✓ Focus LW at small unit and teams (Unit of Actions)
- **CSA JUN 01**
  - ✓ Complete ORD and bring to AROC before POM Lock
  - ✓ Manage soldier power, reduce soldier load and reduce costs while enhancing soldier warfighting capabilities
- **VCSA AUG 01**
  - ✓ Maintain momentum, build on recent successes and overcome emerging challenges
  - ✓ Increase LW funding to achieve FUE in FY04 (Ranger Battalion)
  - ✓ Equip the Ranger regiment and 6 IBCTs by FY08
  - ✓ Fund development of alternate power solutions, IAV integration and other selected near-term objective system enhancements

Land Warrior Cost Model

LW Cost IPT


Functional Area IPTs
MANPRINT
Contracting
Logistics
Test
Performance
Cost
Other
Program
Management
Requirements
Production
Readiness
CEAC and PMO
Co-Chairs
COST IPT
MEMBERS
Cost IPT
SALT
AMC
TRADOC
Army
Budget
Office
ARMY
PA & E
DISC4
DCSLOG
DCSOPS
AEC
CAIG


LW Cost Estimate Timeline
FY01
FY02
FY03
ACAT 1 Status
DAB
NOV 00
APR 01
MAY 01
NOV 01
FEB 02
MAR 02
OCT 02
JAN 03
JUN 03
Published
Published/Supported
Publish
Publish/Support
Publish/Support
Support
V.6 POE
Data Collection/Model Update/Development
LW Cost IPT Start
ACP (MS III Decision & 05-06 BES/PB)
V.6 SBE (03-07 Mini-POM)
V1.0 POE
ACP Published
SBE (04-09 POM/PB)
Spring/Summer Budget Reviews
What-IF Drills
Summer/Fall Budget Reviews
What-IF Drills
V.6 POE Based On:
-V.6 Design
-Prototype Actual Cost
-JCF/AWE
-AAO of 41,547
V.6 SBE Based On:
-V.6 POE Updated
-PM Staffing Changes
-Revised ORD
-IMMC surcharge
-AAO of 47,245
-Risk
V1.0 POE/SBE Based On:
-V1.0 design/new WBS
-HW Design costs from V1.0 design
-Latest MTBF's & HW Operating hrs
-BN "Power Scenario" capability
-Multi-yr Proc contract savings switches
-Depot costs
-Reliability Growth equation
-HMMWV & GATOR Spt Epmt added
-Training/Support estimates updated
-AAO as updated (48,801)
-USMC/MP Bn types placeholder added
-Final ORD
ACP Based On:
-V1.0 POE+
-V1.0 design changes caused by DT/OT
-Actual costs from FY02 prod units
-Other System Advances/Changes
-Updated support plans
-Detailed risk assessment/simulation
-Support source selection process
-Estimate adjustments based on planned V2.0 design changes
-AAO as updated/Add Foreign Bn's?

Land Warrior Cost Model

- Automated cost estimating integrated tools (ACEIT)
- ACEIT provides a structured & automated format to develop accurate cost estimates
- CEAC requires all Program Office Estimate (POE) submitted in an ACEIT file
  - CEAC uses POE ACEIT file to develop the Army's Cost Position (ACP)
  - The ACP ACEIT file will be used by OSD to develop its Independent Cost Estimate (ICE)

ACEIT

- Components
  - Items (Work Breakdown Structure)
  - Quantities (tailored to individual soldier & unit)
  - Costs and cost relationships
  - Assumptions about item and cost behavior over time (e.g., learning curves, step-down functions, etc.)
- Characteristics
  - Detailed and sophisticated spreadsheet
  - By fiscal year over life of program
  - Provides total Life Cycle Costs, cost by appropriation, etc.
  - Models costs based on logic and judgment – more than just "data"

Ground Rules & Assumptions

- FY02 Base Year dollars
- Production
  - Use of LW V1.0 “Prototype 2” actual costs
  - 48,801 basic production units – based on current TO&E, TSM guidance
  - Production quantities based on unit/soldier/duty position matrix
  - Fielding IAW Army Transformation & Army Order of Precedence
  - 18 year system life
- System Operation
  - Peacetime mission profiles from TSM Soldier
  - Most LW system components operate 630 hours annually
  - 10% (63 hrs) annually of “train like you fight” – Use of disposable batteries
- HW technology insertions-3 yrs and component replacements-6 yrs
- Spares calculated based on component Mean Time Between Failures (MTBF’s)
- COMPASS model run provided breakout of which components are consumable and depot repairable
- War reserve disposable battery costs included (brigade set, 30 days)

RDT&E Methodology

- System engineering and program management estimate based on current staffing levels
- Bottoms-up estimate of test costs from testing community
- Software development
  - LW leverages Microsoft® operating systems
  - As operating systems change LW software upgrades become necessary
  - Cost model assumes upgrade to latest operating system every three years
  - Upgrade cost is estimated at 25% of the original development cost

Procurement Methodology

- Estimate based on actual costs from V1.0 detailed BOM
- Prototype-to-Production step downs
  - Typical prototype to production step down 50%
  - Reasons for the step down
    - Aggressive LW prototype schedule
    - Machined parts that will be molded
- Individual learning & rate curves
  - COTS items, Military items, Developmental items, Assembly Labor
  - COTS items example: Printed circuit boards, processor chips, capacitors
- Learning curves
  - Reduce unit costs due to sequential production of the same item
  - Efficiency improves year after year (quantity produced doubles)
- Rate curves
  - Reduce unit costs due to buying larger production lot sizes
  - The fixed costs of production are spread across more units (lot size doubles)

Procurement Methodology Component Replacement

- Component Replacement
  - Component replacement is required over system life
    - COTS SW operating system
    - COTS motherboard, processor, cables
  - Replacement quantity is based on Military/Non-Military HW replacement schedule (6 yrs/9 yrs)
    - Engineering judgment

Land Warrior Technology Insertions / Modernization

- Cost model includes technology insertion and modernization costs
- Technology insertions
  - Every 3 years
  - Incorporates latest technology
    - Latest processors
    - Increased memory

  Inside the box upgrade
- System Modernizations
  - Every 6 years
  - Re-buys enough systems to replace those fielded 6 years earlier
  - Coincides with technology insertions
  - Modernized units get latest technology
  - Replacement is focused on COTS items
  - Military-only items (Multifunction Laser, Weapon User Interfaces) are replaced at 9 years

Land Warrior leverages latest Technology to modernize

Operations & Support Methodology

- **Software maintenance**
  - 10% of original SW development cost (expected change traffic)
- **Replenishment/Consumables**
  - Replen spares quantity based on MTBF, shared learning
  - Consumable Items
    - Batteries - Disposable yearly/Rechargeable 3 years
    - Hardware items not sent to depot are consumable
- **Petroleum, Oil, and Lubricants (mobile battery charging)**
- **Disposal Costs (Dollars per pound times pounds of batteries)**
- **Maintenance Concept – 2 level organic/contractor**
- **POE has Depot Level Repairable's (DLRs)**
  - Finalization of Version 1.0 system design allowed detailed examination of repairable items
  - COMPASS model run determined depot repairable items

Conclusion

- Cost estimate is on track leading to an approved and coordinated Army Cost Position
- Cost estimate is tied to Battalion fielding requirements and automates what-ifs
- Cost estimate is updated at least annually based on the latest actual costs from production of systems

PM Soldier Systems

Questions?

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Project Manager Soldier Systems
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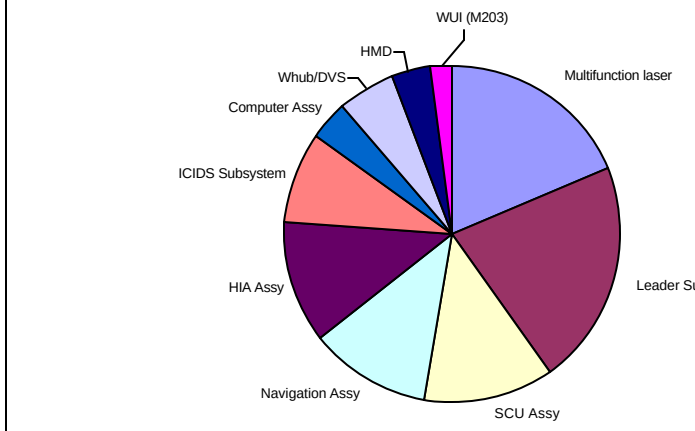
Back Ups

LW V1.0
Top 10 Cost Items



Unit Costs

Multifunction Laser	$5,810
Leader Subsystem	$6,707
SCU Assy	$3,860
Navigation Assy	$3,650
HIA Assy	$3,637
ICIDS Subsystem	$2,687
Computer Assy	$1,189
Whub/DVS	$1,718
WUI (M203)	$674
HMD	$1,159

Multifunction laser | Leader Subsystem | SCU Assy | Navigation Assy | HIA Assy
ICIDS Subsystem | Computer Assy | Whub/DVS | HMD | WUI (M203)

LIFE CYCLE COST COMPOSITION

Current Objective -- POE as of Jan 17, 2003

BY2003$M - FY04-FY21 PRODUCTION SCHEDULE

48,801 systems

HARDWARE COST (OPA ONLY)	Total	Unit $K
Weapon Subsystem	126.34	2.59
Navigation Subsystem	194.23	3.98
Computer subsystem	126.20	2.59
Soldier Control Unit	5.95	0.12
Helmet Subsystem	168.44	3.45
ICIDS Subsystem	240.69	4.93
Body Hub	138.31	2.83
Leader Subsystem	19.47	0.40
Assembly Labor	218.28	4.47
Protective Clothing & Individual Equipment	2.72	0.06
Transportation and Storage	37.20	0.76

BASIC SYSTEM COST	Total	Unit $K
HARDWARE	1,277.83	26.18

WALKAWAY COST	Total	Unit $K
SYSTEM ENG/PROG MGMT	196.79	4.03
SUPT EQUIP/PROD TOOLING	105.01	2.15
POWER SUBSYSTEM	115.90	2.38
TOTAL	1,695.54	34.74

WEAPON SYSTEM COST	Total	Unit $K
TECH DATA	1.50	0.03
NET/TRAINING EQUIPMENT	200.79	4.11
TOTAL	1,897.82	38.89

PROCUREMENT COST	Total	Unit $K
INITIAL SPARES	66.74	1.37
TAX	54.03	1.11
TOTAL (APUC)	2,018.59	41.36

PROGRAM ACQUISITION COST	Total	Unit $K
REPLACEMENT	4,461.31	91.42
Objective Force Warrior	0.00	0.00
BCT A-Kits	83.29	1.71
SW Development	118.61	2.43
DEVELOPMENT ENG/P3I	1,033.05	21.17
SYSTEM ENG/PROG MGMT/OTHER	564.07	11.56
TOTAL (PAUC)	8,278.93	169.65

LIFE CYCLE COST	Total	Unit $K
OMA no Batteries	1,206.35	24.72
IMMC Surcharges	822.48	16.85
OMA Batteries	2,013.31	41.26
TOTAL MP FUNDS (MTOE & SEPM)	22.93	0.47
TOTAL	12,344.00	252.95